

**Claims:**

1. A data reading device comprising  
a housing;  
a first window disposed on a first side of the housing;  
a second window disposed on a second side of the housing;  
a beam scanning mechanism within the housing;  
a light source producing at least one reading beam directed onto the beam scanning mechanism;  
first generating optics for generating a first scan pattern passing through the first window;  
second generating optics for generating a second scan pattern passing through the second window,  
wherein the first scan pattern is optimized for fixed mode scanning and the second scan pattern is optimized for portable mode scanning.
2. A data reading device according to Claim 1 wherein the beam scanning mechanism comprises a rotating mirror facet wheel.
3. A data reading device according to Claim 1 wherein the second scan pattern comprises a single scan line and the first scan pattern comprises a relatively complex multiple line scan pattern.
4. A data reading device according to Claim 1 wherein the first scan pattern optimized for fixed mode is operable for both sweep and presentation modes of scanning.

---

5. A data reading device according to Claim 1 further comprising a switch for switching the data reading device between a first mode generating the first scan pattern and a second mode generating the second scan pattern.
6. A data reading device according to Claim 5 wherein the switch comprises a manually-actuated switch.

7. A data reading device according to Claim 5 wherein the switch comprises a sensor which detects grasping of the device.

8. A data reading device according to Claim 5 wherein in the handheld mode of operation, the data reading device is enabled to read objects with the second scan pattern.

9. A data reading device according to Claim 1 further comprising means for switching the data reading device between a first mode of operation wherein both data reading device is enable to read using both the first and second scan patterns and a second mode of operation wherein the data reading device is enabled to read using only one of the first and second scan patterns.

10. A data reading device according to Claim 1 further comprising a motion sensor which, upon sensing motion of the device, switches the data reading device to a handheld mode of operation.

11. A data reading device according to Claim 1 wherein the rotating facet wheel includes at least one corner cube containing two facets disposed perpendicularly for generating an aiming beam.

12. A data reading device according to Claim 2 further comprising electronics for turning off the light source whenever the reading beam would strike a selected portion of the facet wheel.

13. A method for data reading comprising the steps of providing a housing having at least one opening; providing the data reader with a first mode of operation and a second mode of operation; optimizing the first mode of operation for a first type of scanning; optimizing the second mode of operation for a second type of scanning.

14. A method for data reading according to Claim 13 further comprising switching between the first mode of operation and the second mode of operation.

15. A method for data reading according to Claim 14 wherein the step of switching comprises

switching between the first and second modes of operation, the first mode of operation comprising a fixed mode and the second mode of operation comprising a handheld mode,

optimizing scan pattern produced during the fixed mode of operation by generating a complex scan pattern for reading symbols passed in various orientations in a scan volume, and

optimizing a scan pattern produced during the handheld mode of operation by generating a generally single line scan pattern to be aimed onto a symbol.

16. A method for data reading according to Claim 13 further comprising disabling the second mode while operating in the first mode.

17. A data reading device comprising  
a housing;  
a first window disposed on a first side of the housing;  
a rotating facet mirror within the housing;  
a light source producing a reading beam directed onto the rotating mirror;  
first generating optics for generating a first scan pattern passing through the first window;

wherein the rotating facet wheel includes at least one corner cube containing two facets disposed perpendicularly for generating an aiming beam.

18. A data reading device comprising  
a housing;  
a first window disposed on a first side of the housing;

a rotating facet wheel within the housing, the facet wheel having a facet wheel axis and a plurality of primary mirror facets;  
a light source producing a reading beam directed onto the facet wheel;  
wherein the rotating facet wheel includes at least one corner between a pair of adjacent facets, the corner comprised of first and second corner facets disposed at an inward angle relative to the primary mirror facets, the first and second corner facets intersecting to form a line which is generally coplanar with the facet wheel axis.

19. A data reading device according to Claim 18 wherein as the facet wheel is rotated the reading beam traverses the corner facets to produce a more slowly scanned scan line segment which is directed out of the device, the scan line segment being formed by double reflecting the reading beam, firstly off the first corner facet then off the second corner facet and out the device as the reading beam traverses the first corner facet.

20. A data reading device according to Claim 19 wherein the scan line segment is further formed by double reflecting the reading beam, secondly off the second corner facet then off the first corner facet and out the device as the reading beam traverses the second corner facet.

21. A data reading device according to Claim 18 wherein the facet wheel comprises four primary mirror facets and only one corner.

22. A method of producing a scan line comprising the steps of:  
arranging a facet wheel with a plurality of primary mirror facets;  
arranging a corner between a pair of the mirror facets, the corner comprising first and second corner facets disposed at an inward angle relative to the primary mirror facets;  
rotating the facet wheel;  
directing a light beam onto the rotating facet wheel;

scanning the light beam by double reflecting the light beam impinging on the first and second corner facets, wherein the light beam impinging on the first corner facet is reflected off the first corner facet and onto the second corner facet and out into a scan volume, and wherein the light beam impinging on the second corner facet is reflected off the second corner facet and onto the first corner facet and out into the scan volume.

23. A data reading system comprising

a reader unit having an upper housing section, a tapered lower housing section, and a window in the upper housing section, the reader unit being hand-holdable during a handheld mode of operation;

a base unit having (a) a lower base section supportable on a support surface and (b) an upwardly open cup portion, the tapered lower housing section being removably insertable into the cup portion for supporting the reader housing during a hands-free mode of operation, wherein the cup portion being adjustably connected to the lower base section for allowing orientation adjustment of the reader unit during hands-free mode of operation.

24. A data reading system according to Claim 23 further comprising a swivel section disposed between the cup portion and the lower base section for providing the orientation adjustment of the reader unit during hands-free mode of operation.

25. A data reading system according to Claim 23 wherein the reader unit is constructed and arranged with a low center of gravity for providing stability when disposed in the cup portion of the base unit.

---